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TREE MEDICATION AS A CONTROL OF THE MOUNTAIN PINE BEETLE IN WESTERN WHITE PINE

1935 Investigations

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HISTORICAL

During the past several years the possibility of killing bark-beetle broods by injecting infested trees with poison solutions has been studied by investigators of the Bureau of Entomology and Plant Quarantine. It was not until 1930, however, that tree medication was first tested as a control for the mountain pine beetle in western white pine. As the progress of this project has been given in the five reports listed in the references, it will not be repeated in this report, which presents only an account of the procedure and cost of the 1935 operation.

1935 EXPERIMENTAL INJECTION PROJECT

A portion of the Potter Creek drainage on the Coeur d'Alene National Forest was selected for the 1935 medication experiments. This area is situated three miles from the nearest road, which necessitated the use of pack stock to move and supply the camp. The Forest Service cooperated in providing pack animals, thus eliminating one item of expense. One man and the writer "moved the camp in" on September 3rd and "set it up" with the help of a third man on the following day. Spotting of infested trees was begun on September 5th, and the crew gradually

increased until it comprised eight men: one combination cook and packer, six men who were used for spotting or treating as needed, and the writer. By September 11th, a sufficient number of trees had been spotted, so that treating was begun on the twelfth and continued until the end of the project on September 27th. During this period a total of 283 trees were injecte with various dosages of copper sulphate as follows:

½ lb. crystal $CuSO_4$	4 qts. H_2O	97	trees	
½ lb. powdered $CuSO_4$	4 qts. H_2O	161	"	
1 lb. crystal $CuSO_4$	4 qts. H_2O	5	"	
1½ lbs. " "	" "	5	"	
2 lbs. " "	" "	5	"	
2 " powdered $CuSO_4$	4 qts. H_2O	5	10-inch trees on basis of ½ lb. 1 qt. H_2O for every cubic foot of wood to be treated	
9½ lbs. bulk $CuSO_4$	4¾ gals. H_2O	5	16-inch trees on same basis as above.	

The attempt to inject 9½ pounds of copper sulphate into the 5- to 16-inch trees was not successful owing to the fact that the copper replaced the tin so rapidly that, even with a heavy protective coating of grease, numerous leaks appeared in the collar the day following injection.

The following data were recorded for each of the 283 medicated trees: date of attack, date of treatment, age of attack in days, diameter breast high, crown class, pitch tubes per square foot, surface blue stain at point of injection, color of foliage, exposure, dosage, insolation, temperature at time of injection, and hour at which injection was made. When these trees are examined during June 1936, additional tree data will be recorded as to age of the tree, presence of fungi either on the roots or in the bole, and development of blue stain following injection.

Production:

The number of trees treated per treating man-day during the 1935 project is approximately an average of the treating man-day production during the 1933 and 1934 projects. During 1933, an output of 6.26 trees was attained which is the best production ever secured owing to the grouped condition of the infested trees and the ideal location of the camp in the center of the infestation. The 1934 injections were done in a very scattered infestation, resulting in only 4.12 trees being medicated per treating man-day. The 1935 project shows an average production of 5.09 trees per treating man-day. With these three projects as a basis, it may safely be said that tree medication doubles the production of a control project when compared with the present methods of peeling or decking and burning.

In addition, it may be said that as tree medication continues in

use production will be increased through the development of more efficient tools suited exactly for the purpose of medication. Further increases in production can be expected through the use of standard poison solutions prepared in camp, and through the development of a simpler injection technique.

Cost:

The cost of the 1935 project is shown in detail in the following itemized list:

		Total	Per Tree	Total	Per Tree
Labor	(Spotting	$108.91	$.385		
	(Treating	191.64	.677		
	(Camp	63.90	.225		
Total Labor				$364.45	$1.287
Subsistence (Includes Cook's Salary)				164.55	.582
Transpotation				16.77	.059
Materials and equipment				96.38	.341
Total				$642.15	$2.269

These costs are decidedly lower than those of either the 1933 or 1934 projects. The average cost per tree during the 1933 project was $4.328, and $4.471 in 1934. The per-tree cost in 1935 was $2.202 cheaper than in 1934 and $2.058 cheaper than in 1933. This reduced cost of operation results from the following: (1) the lower cost of

copper sulphate as compared with sodium arsenate, (2) lower subsistence costs, (3) slightly lower wage scale, and (4) lower transportation costs compared with the 1933 project. It should be stated that as the number of trees spotted was more than the number to be treated, all outlying trees, i.e., trees removed some distance from the main body of the infestation, which are of course the most expensive to treat, were not included in the project. Ordinarily these trees would be treated during control, which would lower the number of trees treated per treating man-day and thus raise the cost of the 1935 trees slightly.

CONCLUSION

On the whole, the 1935 project was very satisfactory both from the standpoint of cost and production. Together with the two previous medication projects, it demonstrates that western white pine trees can be treated decidedly cheaper by medication than by present control methods. I therefore believe that no further stress need be placed on this phase of the problem until it is actually put into use by regular control crews.

Considerable experimental work must yet be done, however, on the medication itself before it is recommended as a control method. Results in the past have been entirely too variable, and we are yet unable to make definite statements relative to s matters as the age of attack which can successfully injected, the optimum amount of poison per tree, and the poison best suited for the work. These variable results are probably due to the fact that we attempted to answer too many questions with

too few trees and as a result were unable to make satisfactory comparisons between methods and poisons. I believe that, if we knew more concerning the reason for the mortality which results following injection, we would make more rapid progress in solving this problem. That is, if we knew exactly what we were striving for, other possibilities of accomplishing this end might become apparent.

It is hoped that with complete tree data recorded for 283 trees, all medicated with the same poison and with the same injection technique, it will be possible to state which of the various factors can be termed critical. Following the examination of these trees, a comprehensive working plan will be submitted.

Respectfully submitted,

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Feb. 3, 1936

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